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IS 11087 (1986): Paper for magnetic ink character recognition cheque printing [CHD 15: Paper and its products]

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Indian Standard
SPECIFICATION FOR
PAPER FOR MAGNETIC INK CHARACTER
RECOGNITION CHEQUE PRINTING
(*First Revision*)

UDC 676.224.2 : 336.717.122.4



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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR
PAPER FOR MAGNETIC INK CHARACTER
RECOGNITION CHEQUE PRINTING

(*First Revision*)

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(*Continued on page 2*)

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(*Continued on page 12*)

Indian Standard

SPECIFICATION FOR
 PAPER FOR MAGNETIC INK CHARACTER
 RECOGNITION CHEQUE PRINTING

(*First Revision*)

0. F O R E W O R D

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 28 February 1986, after the draft finalized by the Paper and Its Products (Excluding Packaging Materials) Sectional Committee had been approved by the Chemical Division Council.

0.2 One of the basic functions of banking is to receive cheques for collection and to credit the proceeds to customers accounts. During the last two decades and particularly after nationalization of major commercial banks in the country and due to growing banking habits, etc, there has been a large increase in banking transactions. It is estimated that roughly a million cheques are cleared every day in the country. The system of cheque clearance is at present fully manual. The increase in volume of cheques has given rise to problems of inordinate delay in the process of cheque clearance, ranging from 3 to 4 weeks and the system has come under serious strain. In order to relieve the strain and to improve efficiency, the Reserve Bank of India, at the instance of the Government of India, set up a working group to examine the feasibility of introducing national clearing of cheques and the connected modalities.

0.3 During the last 20 years, banking organizations in developed countries have been taking advantage of the developments in the electronics and data processing fields. A significant step forward has been the introduction of systems like Magnetic Ink Character Recognition (MICR) and Optical Character Recognition (OCR). MICR is a system where information is printed with special ink containing iron oxide. In the OCR system, the computer reads the data by photo electric scanning.

0.4 The working group set up by the Reserve Bank of India, after detailed study of the operation of the systems in developed countries, had recommended the adoption of the MICR system of cheque processing in view of its successful adoption by countries like USA, UK, Australia, Canada and Japan and also easy availability of computer support software for MICR.

0.5 In the MICR system of cheque processing, the relevant particulars of the cheque such as bank number, branch number, account number and the amount has to be written at a specified area on the forms in a specified type (known as FONT). Two FONT's are in use, one known as E 13 B and the other CMC 7. The cheques are then to be fed to the electronic sorting machines viz., reader/sorter. The machines, which work at phenomenal speeds ranging from 400 to 3 000 cheques per minute, read the MICR code line and direct the cheques to individual pockets at high speed. It also lists the cheques deposited in each pocket.

0.6 Standardization of cheque forms is a pre-requisite for introducing mechanized cheque processing system. Standardization is required not only on size but also for paper quality. This standard has been prepared at the instance of the Reserve Bank of India for meeting this special requirement.

0.7 This specification was first published in 1984 deriving considerable information from the following Publications:

NF-Q-14-004 Characteristics of paper for printing with magnetic characters. Association Francaise De Normalization, France.

9-GP-47M Standard for: Paper, Bond for Magnetic Ink Character, Recognition Cheque Printing. Canadian Government Specification Board, Canada.

Report of the Working Group of Reserve Bank of India on 'Feasibility of introducing MICR/OCR technology for cheque processing'.

0.8 After the publication of the standard, it was felt that chances of encountering magnetizable particles in paper is remote and document readers/sorters used for cheque clearance can be pre set to ignore the presence of stray magnetism, hence appropriate in-process controls by the paper manufacturers could replace the test method for detecting presence of magnetizable particles. Accordingly, Amendment No. 1 to IS : 11087-1984 was issued in October 1985. This standard has been revised in the light of experience gained in the manufacture of the paper. The main changes introduced in this revision, apart from incorporating Amendment No. 1, are (a) the requirement of the size of paper and the watermark to cover the special needs of paper supplied in the roll form, (b) incorporation of the requirement of sensitization of the paper, and (c) the method of reporting the result for the requirement of smoothness.

0.9 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (revised).

1. SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for paper for magnetic ink character recognition (MICR) cheque printing.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 4661-1986* and the following shall apply.

2.1.1 Square Cut — Sheets cut to the desired size with clean edges and four 90° angles.

2.1.2 Bending Force — The force in Newtons necessary to deflect a rectangular test piece, clamped at one end, through a bending angle of 15° when the force is applied near to the free end of the test piece, normal to the plane which includes the near edge of the test piece clamp and the point or line of application of the force.

2.1.3 Bending Length — The constant radial distance between the clamp end and the position of the test piece at which the force is applied.

2.1.4 Bending Angle — The angle between the initial plane of the test piece and the plane passing through the line of clamping and the line of application of force at the end of the test.

2.1.5 Free Length — The initial length of the test piece that projects from the clamps.

3. REQUIREMENTS

3.1 Description — Paper for MICR cheque printing shall be of uniform formation, evenly finished, smooth and free from embossments or heavy engravings, dust, fluff, pinholes and specks. It shall be free from any unbleached or ground wood pulp and fluorescent brighteners. The paper shall be flat and without curl. It shall be exactly square cut.

3.2 Absence of Magnetizable Particles — The paper shall be free from magnetizable practices.

NOTE — The paper manufacturers should exercise appropriate process control to ensure this requirement.

3.3 Substance — The substance of paper meant for MICR cheque printing shall be 95 g/m². For determination of substance, select 10 sheets at random and cut from each, a test piece of size 25 × 25 cm (or 25 × 20 cm or 25 × 40 cm). Proceed as prescribed in 6 of IS : 1060 (Part 1)-1966†. No single test result shall vary by more than ± 5 percent from the nominal substance. Further, the mean of 10 test results shall not vary from the nominal substance by more than ± 2.5 percent.

3.4 Thickness — The paper shall have a nominal thickness of 110 µm. A tolerance of ± 10 µm shall be permitted on the nominal thickness, when tested according to 7 of IS : 1060 (Part 1)-1966†.

*Glossary of terms used in paper trade and industry (*first revision*).

†Methods of sampling and test for paper and allied products: Part 1 : revised .

3.5 The paper may be supplied in the form of either rolls or sheets as agreed to between the purchaser and the supplier. The sizes and tolerances on sizes shall be in accordance with IS : 1064-1980* unless otherwise agreed to between the purchaser and the supplier.

3.5.1 The sizes of paper supplied shall facilitate making of cheques in either of the following two sizes with the length of the cheque being in the machine direction in the case of sheets and in cross direction in the case of rolls of paper:

Size A : 70×165 mm } Tolerances on these sizes shall be in
 Size B : 93×203 mm } accordance with IS : 1064-1980*.

3.6 In addition to the above requirements, the paper shall also comply with the requirements given in Table 1, when tested in accordance with the relevant test methods prescribed in col 4 of Table 1.

TABLE 1 REQUIREMENTS FOR PAPER FOR MICR CHEQUE PRINTING

| SL. No. | CHARACTERISTIC | REQUIREMENT | METHOD OF TEST, REF TO |
|------------|----------------------------|--|-------------------------------------|
| (1) | (2) | (3) | (4) |
| i) | Smoothness, s/50 ml, Min | 35 | 4 of IS : 9894-1981* |
| ii) | Porosity, s/100 ml, Min | 25 | Appendix A of IS : 3413-1977† |
| iii) | Opacity, percent, Min | 80 | 16 of IS : 1060 (Part 1)-1966‡ |
| iv) | Wax pick (on both sides) | No pick on 10 A | 8 of IS : 1060 (Part 3)-1969§ |
| v) | Tearing strength, mN, Min | 700 (in both directions) | 12 of IS : 1060 (Part 1)-1966‡ |
| vi) | Stiffness, gf.cm, Min | Cross direction = 1.2 Machine direction = 3.0 | Appendix A |

*Method of test for smoothness/roughness of paper.

†Specification for base paper for carbon paper (*first revision*).

‡Methods of sampling and test for paper and allied products: Part 1 (*revised*).

§Methods of sampling and test for paper and allied products: Part 3.

3.7 Colour — The colour shall be a close match to the shade specified by the buyer.

3.8 Watermark — The paper shall be watermarked as specified by the buyer. The distance between any point on a watermark and the same point on the adjacent watermark shall be 70 ± 3 mm or 93 ± 3 mm as

*Specification for paper sizes (*second revision*).

specified by the buyer in the case of sheets. The distance between any point on a water mark in the case of rolls, shall be as specified by the buyer.

3.8.1 A clear band of at least 16 mm free from any watermark shall also exist at the bottom of the cheque in the case of cheques made from sheets.

3.9 The cheque paper shall be sensitized to various chemicals, solvents and ultra-violet rays as required by the purchaser.

4. PACKING AND MARKING

4.1 The packing of paper shall be done so as to ensure that the paper is not damaged due to handling and transportation (*see IS : 6211-1971**) and shall be as agreed to between the purchaser and the supplier.

4.2 Each package shall be marked with the following particulars:

- a) Description, thickness in μm and substance, in g/m^2 of the paper;
- b) Size of paper in the package or length and width of the roll;
- c) In the case of sheets, the mass in kg per ream of 500 sheets including wrapping paper when determined in accordance with the method prescribed in Appendix B; in the case of rolls, the mass in kg of the roll including the mass of the core and plugs;
- d) Lot number;
- e) Month and year of the manufacture; and
- f) Manufacturer's name or recognized trade-mark; if any.

4.2.1 The package may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING AND CRITERIA FOR CONFORMITY

5.1 Representative samples for test shall be drawn as given in 3 of IS : 1060 (Part 1)-1966†.

*Code of practice for packaging of paper and board.

†Methods of sampling and test for paper and allied products: Part 1 (*revised*).

5.2 Number of Tests — Each of the selected units shall first be tested for requirements in **3.3**. Then from each of these units, number of sheets sufficient to carry out all tests specified in Table 1 shall be taken out at random. These sheets shall constitute a sample. These sheets shall first be examined for requirements given in **3.1, 3.2, 3.4, 3.5, 3.6, 3.8** and **3.9**, and then the number of test pieces for each of the characteristics as indicated in its test method shall be cut from them. These pieces shall be tested according to the methods specified in Table 1.

5.3 Criteria for Conformity

5.3.1 A sheet not meeting the relevant requirements for any one or more characteristics shall be considered as 'defective'.

5.3.2 A lot shall be declared as conforming to the requirements of this specification if the number of defective sheets found, does not exceed the acceptance number. This acceptance number is zero in **3.3**. For all other requirements, the acceptance number depends upon the size of the sample and shall be equal to zero if the size is less than 13 and one if the size is greater than or equal to 13.

A P P E N D I X A

[*Table 1, Item (vi)*]

TEST FOR STIFFNESS

A-0. OUTLINE OF THE METHOD

A-0.1 Measurement of the force required to bend a test piece clamped at one end through a given angle; the force is applied at a constant distance from the line of clamping.

A-1. APPARATUS

A-1.1 Any system may be used that is capable of acting on the test piece to measure the bending force to a degree of precision in accordance with the specification for instrument accuracy.

A-1.2 The clamp should grip the test piece across its full width and along its length for a distance of not less than 12.7 mm when test pieces are inserted. The test piece should not be restrained at the free end except by the friction imposed by the surface of the free end of the test piece on the indicating or recording mechanism.

A-1.3 The nominal bending length is 10 mm. This bending length allows the use of several types of instruments that have been found satisfactory. For the most accurate work, however, the results shall be corrected for differences in the nominal bending length.

A-1.4 The instrument employed shall comply with the following requirements, within the given limits of accuracy:

- a) bending angle $15^{\circ} \pm 0.1^{\circ}$,
- b) bending length $38.0^{+2.5}_{-0.1}$ mm,
- c) test piece width 38.0 ± 0.2 mm,
- d) rate of bending such that a bending angle of 15.0° is reached in not less than 3 s and not more than 20 s. It is essential that bending during the test is continuous and the rate of bending should be reasonably constant, and
- e) scale readings accurate to ± 2 percent on the appropriate range.

A-1.5 Equipment for cutting of the test piece to the required accuracy is also needed. This may consist of a knife and template, a guillotine or a punch.

A-2. PROCEDURE

A-2.1 Select units and sheets and take specimens according to 3 of IS : 1060 (Part 1)-1966*.

A-2.2 The samples shall be conditioned in accordance with 5 of IS : 1060 (Part 1)-1966*, and sample preparation and testing shall be carried out in the conditioning atmosphere specified.

A-2.3 Cut test pieces 38.0 ± 0.2 mm wide and 38 ± 5 mm long. A minimum number of ten test pieces is required in each test direction. There shall be no folds, creases, visible cracks or other defects on the area to be tested and the test piece shall not include any part of the sample that is less than 15 mm from the edge of the sheet or reel. If watermarks are present, this should be stated in the test report.

NOTE — When testing the machine direction or cross direction stiffness of the paper, the appropriate direction is perpendicular to the width of the test piece.

A-2.4 Carry out the operations involved in the measurement of stiffness of each test piece in the manner recommended for the type of instrument in use.

A-2.5 Insert the test piece in the clamp in such a manner that the length that projects from the clamp (the free length) is 10 ± 3 mm and the test piece is correctly aligned.

A-2.6 The standard bending angle is 15° .

A-2.7 Deflect each test piece through an angle of 15° to one side of the unstressed position and then immediately return the test piece through

*Methods of sampling and test for paper and allied products: Part 1 (*revised*).

the zero position and deflect it through an angle of 15° to the other side of the unstressed position. In each direction take the reading as soon as the 15° deflection has been reached. Should the instrument be so designed that deflection is possible to one side only of the unstressed position, then equal numbers of test pieces with opposing surfaces towards the direction of deflection should be tested. No test piece shall be re-used after it has been removed from the instrument clamp.

A-2.8 When each test piece is deflected to both sides of the unstressed position, ten test pieces and twenty readings are required. For instruments in which each test piece is deflected to only one side of the unstressed position, twenty test pieces and twenty readings are required. Where a distinct partial fracture or considerable permanent deformation of the test piece occurs during a test, the results of this test shall be ignored.

A-3. CALCULATION AND EXPRESSION OF RESULTS

A-3.1 Calculate the arithmetic mean of the twenty readings and express the stiffness in Newtons to three significant figures. For instruments giving readings of stiffness in gramforce the result may be expressed as stiffness in Newtons by multiplying the reading in gramforce by 9.81×10^{-3} . For instruments giving readings as values of bending moment in gramforce centimetres (sometimes called 'units' or 'Taber units') the result may be expressed as stiffness in Newtons by multiplying the units figure by 9.81×10^{-3} and dividing by the bending length in centimetres. For the most accurate work the effect of the precise bending length used on the stiffness shall be taken into account.

Hence,

$$\text{Stiffness} = \frac{L^2}{2500} \times \text{measured bending force.}$$

where

L = bending length in mm.

A-4. TEST REPORT

A-4.1 The test report shall include the following particulars, results being given separately for machine direction and cross direction tested:

- a) Description and identification of the material tested,
- b) The type of instrument used,
- c) The direction of the test,
- d) The number of replicate tests carried out if other than ten (or twenty), and
- e) The mean stiffness in milli Newtons or Newtons to three significant figures.

A P P E N D I X B

(Clause 4.2)

DETERMINATION OF NOMINAL MASS OF REAM

B-1. The nominal mass of ream of paper shall be calculated according to the following formula:

$$R = \frac{(A \times B \times C) + D}{1\,000},$$

where

R = nominal mass of reams of paper in kg,

A = nominal substance of paper in g/m²,

B = nominal number of sheets of paper in a ream,

C = nominal area of each sheet in m², and

D = nominal mass of the wrapping paper in g.

(*Continued from page 2*)

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AMENDMENT NO. 1 SEPTEMBER 1993

TO

IS 11087 : 1986 SPECIFICATION FOR PAPER FOR MAGNETIC INK CHARACTER RECOGNITION CHEQUE PRINTING

(First Revision)

(Page 4, clause 0.9) — Add this new clause after clause 0.8 and renumber the subsequent clause:

'0.9 A scheme for labelling environment friendly products known as ECO Mark has been introduced at the instance of the Ministry of Environment and Forests (MEF), Government of India. The ECO Mark would be administered by the Bureau of Indian Standards (BIS) under the BIS Act, 1986 as per the Resolutions No. 71 dated 21 February 1991 and No. 425 dated 28 October 1992 published in the Gazette of the Government of India. For a product to be eligible for marking with ECO logo, it shall also carry the  Mark of BIS besides meeting additional optional environment friendly requirements. For this purpose, the Standard Mark of BIS would be a single mark being a combination of the  Mark and the ECO logo. Requirements to be satisfied for a product to qualify for the BIS Standard Mark for ECO friendliness, will be included in the relevant published Indian Standards through an amendment. These requirements will be optional; manufacturing units will be free to opt for the  Mark alone also.

This amendment is based on the Gazette Notification No. 455 dated 13 November 1992 for paper as environment friendly products published in the Gazette of India. This amendment is, therefore, being issued to this standard to include environment friendly requirements for paper for magnetic ink character recognition cheque printing.'

(Page 7, clause 3.9) — Add the following new clause after 3.9:

‘3.10 Optional Requirements for ECO Mark

3.10.1 General Requirements

3.10.1.1 The product shall conform to the requirements for quality and performance prescribed under clauses 3.1 to 3.9.

3.10.1.2 The manufacturer shall produce to BIS, the environmental consent clearance from the concerned State Pollution Control Board as per the provisions of Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 along with the authorisation, if required, under the Environment (Protection) Act, 1986 and the rules made thereunder, while

3.10.2 Specific Requirements

3.10.2.1 The material shall be of the following two types depending on the raw material used in the manufacture:

a) *Type A* — Manufactured from pulp containing not less than 60 percent by mass of pulp made from materials other than bamboo, hard woods, soft woods and reed.

b) *Type B* — Manufactured from pulp made from 100 percent waste paper.'

(*Page 7, clause 4.1*) — Add the following new clause after 4.1:

'**4.1.1** For ECO Mark, the product shall be packed in such packages which shall be recyclable/reusable or biodegradable.'

(*Page 7, clause 4.2.1*) — Add the following new clause after 4.2.1:

‘4.2.2 For ECO Mark, following additional information may also be marked on the container/package:

The criteria for which the product has been labelled with ECO Mark.'

AMENDMENT NO. 2 MARCH 2002
TO
IS 11087 : 1986 SPECIFICATION FOR PAPER FOR
MAGNETIC INK CHARACTER RECOGNITION
CHEQUE PRINTING

(First Revision)

(Page 6, clause 3.5.1) — Substitute the following for the existing:

‘3.5.1 The size of paper supplied shall facilitate making of cheques in either of the following two sizes with the length of the cheque being in the machine direction in the case of sheet and in cross direction in the case of roll of paper or the sizes of sheets and reels shall be as agreed to between the purchaser and the supplier.

Size A: 70×165 mm

Size B: 93×203 mm

Tolerances on sizes shall be in accordance with IS 1064:1980*.'

(CHD 15)

AMENDMENT NO. 3 JULY 2007
TO
IS 11087 : 1986 SPECIFICATION FOR PAPER FOR
MAGNETIC INK CHARACTER RECOGNITION
CHEQUE PRINTING

(First Revision)

[*Page 6, Table 1, col 3, Sl No. (v)*] — Substitute ‘600 (in both directions)’ for ‘700 (in both directions)’.

(*Page 6, clause 3.8*) — Substitute the following for the existing clause:

‘3.8 Watermark The paper shall be watermarked as specified by the buyer. The distance between any point on a watermark and the same point on adjacent watermark shall be as specified by the buyer with condition that a minimum of one full watermark shall appear in each and every security instrument.’

(CHD 15)

AMENDMENT NO. 4 SEPTEMBER 2008

TO

**IS 11087 : 1986 SPECIFICATION FOR PAPER FOR
MAGNETIC INK CHARACTER RECOGNITION
CHEQUE PRINTING**

(First Revision)

(Page 7, clause 3.10, read with Amendment No. 1) — Substitute ‘Additional Requirements for ECO Mark’ for ‘Optional Requirements for ECO Mark’.

(CHD 15)